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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/816,937	03/23/2001	James F. Brennan III	55524USA9A.002	6957
32692	7590	12/22/2003	EXAMINER	
3M INNOVATIVE PROPERTIES COMPANY PO BOX 33427 ST. PAUL, MN 55133-3427			SUCHECKI, KRISTYNA	
			ART UNIT	PAPER NUMBER
			2882	

DATE MAILED: 12/22/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 09/816,937	Applicant(s) BRENNAN ET AL.
	Examiner Krystyna Suchecki	Art Unit 2882

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 29,30 and 32-40 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 29,30 and 32-40 is/are rejected.
- 7) ☐ Claim(s) ____ is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on ____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on ____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. ____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- | | |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) Paper No(s). ____. |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449) Paper No(s) ____. | 6) <input type="checkbox"/> Other: _____. |

DETAILED ACTION

Information Disclosure Statement

1. Please find attached a copy of the May 8, 2001 IDS as requested.

Claim Rejections - 35 USC § 112

2. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

3. Claims 34, 35 and 38 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. Reference to an "inverse of a relative delay between frequencies in each cycle of the frequency modulated signal" has no basis in the specification as it appears in the claim. Either inconsistent terminology has been used, or Applicant intends to encompass matter beyond the scope of the original disclosure. For Claim 38, a "linear-shaped wave" is referenced. While a linear dispersion is referenced in the disclosure, this does not properly correspond to encompass the presence of a "linear-shaped wave". As waves are oscillatory, Applicant has correctly described waves as "sinusoidal", "sawtooth" or "square". The special meaning or usage of "linear-shaped" has not been previously described, and seems to attempt to encompass embodiments not originally disclosed. Claim 35 is improper for sending a frequency modulated signal to the frequency modified laser. From the disclosure, the frequency modulated signal is what frequency modifies the laser (This embodiment will be assumed for examination purposes).

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Applicant is advised that the claim is improper since it suggests that an already modified laser is re-modified by another signal, which is not a part of the original disclosure.

4. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

5. Claims 29-30 and 32-40 rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Claim 29 recites the limitation "a cycle of the frequency modulated signal" in lines 5-6, and Claim 32 recites "wherein the signal is frequency modulated by applying a current across the reflective element". There is insufficient antecedent basis for this limitation in the claim. A frequency modified optical signal has been properly introduced, but the frequency modulated signal has not. For examination purposes, a frequency modified signal will be assumed for claim 29 and for claim 32, "the signal is frequency modified" will be assumed.

6. Claims 29-30 and 32-40 are rejected under 35 U.S.C. 112, second paragraph, as being incomplete for omitting essential steps, such omission amounting to a gap between the steps. See MPEP § 2172.01. The omitted steps are: for Claim 29, the method used to provide a frequency modulated signal, the provision of a dispersive element with a chirp and the steps that lead to producing an actual pulse train, so that life and meaning are given to the creation of the pulse train.

Claim Rejections - 35 USC § 102

7. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

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A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

8. Claims 29, 30, 34, 35, 37 and 39 are rejected as best understood under 35 U.S.C. 102(b) as being anticipated by Harter (US 5,696,782).

9. Regarding Claim 29, Harter teaches a method for producing a pulse train, comprising the steps of: providing a source of a constant amplitude frequency modified optical signal (Column 7, lines 22-24); providing a dispersive element (Item 670); matching a chirp of the dispersive element with a cycle of the frequency modulated signal; and directing the signal into the dispersive element (Figure 6); wherein the source is a frequency modified laser (Column 6, lines 7-10), and wherein the dispersive element is a long fiber Bragg grating (Item 670 is understood to be a long fiber Bragg grating since a second compressor, 760 appears to be the reverse of stretcher 720, which is defined as a long fiber Bragg grating; also, Column 6, lines 39-42).

10. Regarding Claim 30, Harter teaches a single mode signal source (Column 7, line 16).

11. Regarding Claim 34, Harter inherently teaches matching comprising matching the inverse of a relative delay between frequencies in each cycle of the frequency modulated signal. Because the Harter reference teaches the use of the same method of producing a pulse train utilizing frequency modified optical signals and dispersive elements, it is inherent that the same method will have the same properties such as matching the inverse of a relative delay between frequencies in each cycle of the frequency modulated signal (See *In re Fitzgerald*, 619 F.2d 67, 70, 205 USPQ 594, 596 (CCPA 1980)). A mismatch between the frequency modified optical signals and the dispersive element would lead to undesirable results. That Harter does not

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intentionally introduce these undesirable results leads to an understanding that they are not present.

12. Regarding claim 35, Harter teaches sending a frequency modulated signal to frequency modify the laser, wherein a frequency of the frequency modulated signal is about 100 MHz or less (Column 7, lines 22-65 and Column 9, lines 7-10). This is understood since a tunable laser is directly frequency-chirped, and this requires a modulation signal to act on the laser to modify it.

13. Regarding Claim 37, Figure 6 of Harter teaches a frequency modulated signal comprising a square wave, as evidenced by the output of the laser (600) being a square wave (SS).

14. Regarding Claim 39, Harter teaches matching further comprising matching a high order dispersion component of the dispersive element with a residual nonlinear chirp. This is understood from Harter's statement that the lasing system, particularly the chirped gratings, are designed to accommodate nonlinear effects (Column 9, line 36), and dispersion is a known nonlinear effect.

Claim Rejections - 35 USC § 103

15. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

16. Claims 36 and 38 (as best understood) are rejected under 35 U.S.C. 103(a) as being unpatentable over Harter in view of Galvanauskas (5,633,885).

17. Regarding Claims 36 and 38, Harter teaches a method of producing a pulse train above using a square wave.

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18. Harter fails to teach a sawtooth or “linear-shaped” wave.

19. Galvanauskas teaches a sawtooth (Figure 5) and square wave for tuning a laser device (Column 3, line 40- Column 4, line 13). Also taught is the flexibility to produce any required waveform, understood to include a “linear-shaped” wave (Column 4, lines 51-57). The waves are taught in order to control and compensate for nonlinear frequency chirp (Column 3, lines 52-55) in order to produce a pulse with a short duration (Column 2, line 64- Column 3, line 1). The waves are also used with appropriately chirp-matched gratings (Column 5).

20. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to use a sawtooth or “linear-shaped” wave as taught by Galvanauskas in the device of Harter in order to control and compensate for nonlinear frequency chirp (Galvanauskas, Column 3, lines 52-55) in order to produce a pulse with a short duration (Galvanauskas, Column 2, line 64- Column 3, line 1).

21. Claims 32-33 and 40 are rejected under 35 U.S.C. 103(a) as being unpatentable over Harter in view of Kjebon.

22. Regarding Claims 32-33 and 40, Harter teaches a method for producing a pulse train above, but fails to teach a source comprising a laser equipped with a reflective element, wherein the signal is frequency modulated by applying a current across the reflective element and wherein the current modulates the center wavelength of the reflective element by way of carrier induced index changes. Harter also fails to teach the source comprising a non-mode-locked frequency-modified laser.

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23. Kjebon teaches a method for producing a pulse train above comprising a laser equipped with a reflective element, wherein the signal is frequency modulated by applying a current across the reflective element and wherein the current modulates the center wavelength of the reflective element by way of carrier induced index changes (Page 489). Kjebon also teaches the source comprising a non-mode-locked frequency-modified laser (Page 488-489). The laser is taught in order to increase resonance frequency and reduce damping of the resonance peak in order to yield high modulation bandwidth (Abstract).

24. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to use the laser of Kjebon in the system of Harter in order to eliminate the need for a separate mode-locking feature (which limits pulse energies [Harter, Column 2, lines 38-40]) and in order to increase resonance frequency and reduce damping of the resonance peak in order to yield high modulation bandwidth (Abstract).

Response to Arguments

25. Applicant's arguments filed 09/22/03 have been fully considered but they are not persuasive. Regarding arguments that Harter fails to teach a "constant amplitude, frequency modified" signal, Applicant has overlooked Harter's statement that his invention is an improvement to cw systems (Column 5, lines 44-46). Also the frequency chirping of Harter constitutes frequency modification, since no other limitation in the claim precludes this interpretation.

26. Regarding the step of "matching a chirp", please see the 35 USC § 112 rejection above. The drawings of Harter show that the dispersive element is chirped (item 670), and the disclosure shows that the signal is frequency modified (Column 7, line 21-23). Since it is not ordinary to

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cause a mismatch between the signal and dispersive elements of such a lasing system, and Harter has not drawn attention to such a mismatch, a reason as to why a system would be designed to cause these elements to conflict, i.e. not match, is lacking. Lacking a reason to mismatch the elements, Applicant's arguments are not persuasive.

27. In response to applicant's argument that the references fail to show certain features of applicant's invention, it is noted that the features upon which applicant relies (i.e., a specific size to qualify the term "long") are not recited in the rejected claim(s). Although the claims are interpreted in light of the specification, limitations from the specification are not read into the claims. See *In re Van Geuns*, 988 F.2d 1181, 26 USPQ2d 1057 (Fed. Cir. 1993). It is noted that Harter teaches two types of gratings: reflection and transmission. The transmission gratings are preferred, and are synonymous with long period gratings (see for example Erdogan, page 1278, column 2, para. 2).

Conclusion

28. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

29. A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event,

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however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

30. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Krystyna Suchecki whose telephone number is (703) 305-5424.

The examiner can normally be reached on M-F 8-6, with alternating Fridays off.

31. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Edward Glick can be reached on (703) 308-4858. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9318.

32. Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 305-4900.

ks



DAVID V. BRUCE
PRIMARY EXAMINER